Being On-line Together

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PART TWO

The Social Perspective

Social Comparison and Support Messages

CHAPTER 4

Online Peer Support and Breast Cancer Patients' Psychological Well-being: The Role of Optimistic and Pessimistic Social Comparisons

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Abstract

Due to mixed findings in research on the effectiveness of online peer support, there is a need for studies explaining when and why online support groups are beneficial for patients. The present study examines social comparison processes (i.e., upward identification, downward contrast, upward contrast, downward identification), online activity within the community, and patients' psychological well-being. Results showed no direct associations between online activity and psychological well-being. Downward identification and upward contrast comparisons were related to lower levels of emotional well-being and higher levels of depression and breast cancer-related concerns. Although the interaction was marginally significant, a positive relationship between pessimistic social comparisons (i.e., downward identification) and breast cancer-related concerns appeared particularly prominent among patients who showed high levels of activity within the online support community.

Introduction

With the advent of the Internet, a growing amount of individuals search online for health-related information[1]. Studies showed that breast cancer patients are among the most active seekers compared to other patients[2,3]. An increasing number of online breast cancer support communities – often designed as bulletin boards or forums – allow cancer patients to share information and experiences from anywhere at any time, which is often seen as an advantage compared to offline support groups[4].

Research on the effects of online peer support on patients' well-being has shown mixed findings (literature reviews[5–7]). Most studies suggest positive effects, such as decreased depression and perceived stress (e.g.,[8,9]), but other online support studies found no significant results[10] or even negative outcomes[11]. These varying findings might be explained by several factors. First, most effect studies assess professionally organized online support interventions instead of self-generated, peer-led online communities[5]. For an exception see[12]. One likely reason is that testing peer-led communities is complicated due to its uncontrolled setting; participants are anonymous and arrive and leave the community whenever they please. Furthermore, researchers mostly receive funding to create an evidence-based online support intervention to help patients. It has, however, been argued that these professionally designed online support interventions are often less suited to test effects of mere peer support because they include other intervention components designed to increase patient well-being, such as decision making tools or skill training[5]. Additionally, this results in an underrepresentation of effect studies on self-generated online communities, while these communities are common online and easily accessible to anyone. Hence, there is a lack of studies testing the effects of sheer peer support as is provided in peer-led online communities.

A second reason for mixed findings might be the varying processes that can occur online. Most studies that examined peer-led support communities are descriptive in nature, typically studying online interactions and interviewing users. These descriptive studies suggest that several empowering processes play a role in online support communities, such as a sense of community, informational and emotional support, recognition, understanding, and insight, but they also suggest – though mentioned less often – disempowering aspects, such as being confronted with complainers or the negative sides of the illness (e.g.,[13–16]).

However, robust empirical evidence regarding the effects of such (dis)empowering processes is lacking. Effects might depend on the level of online activity within the support group, as studies for example suggest that effects may

differ for lurkers and posters[14,17]. Furthermore, individual differences in dealing with illness are likely to play a role. For example, a recent study showed that online active support group participation is especially beneficial for patients with a low score on emotional approach coping[18].

In the current study, we focus on the interplay between online activity and individual differences in dealing with illness-stories from other support community members. Specifically, we propose and test the hypothesis that online activity (i.e., how intensively patients visit and use the online platform) and individual differences in social comparisons (i.e., how breast cancer patients relate their own situation to the situation of other patients) codetermine psychological health outcomes. In the next section, we elaborate on the social comparison literature, and we examine how social comparison processes may influence the effects of online support group participation on psychological well-being.

Online peer support, social comparison processes and well-being

Next to giving and receiving informational and emotional support, one of the reasons why patients join online support groups is to compare their own situation with that of others. Patients may find understanding and recognition in social comparison with peers[16] and use survivor stories as a source of inspiration[14]. In their online search for information patients may though also encounter negative narratives. Some patients mention difficulties in dealing with stories showing the negative sides of the disease[16,19,20], and sometimes even withdraw from the online community for that reason[21,22]. Previously observed divergent effects of online support group participation may partly be caused by individual differences in coping with stories from others.

Social comparison literature provides valuable insights by showing how individuals relate their own situation to the situation of others. Especially in times of uncertainty – such as being diagnosed with breast cancer – specific comparisons with similar others can help individuals evaluate and cope with their personal situation[23]. Two types of comparison exist, determined by their direction: *Downward social comparisons* concern comparisons with others doing worse, and *upward social comparisons* refer to comparisons with others that are better off. The Contrast/Identification Model of Buunk and colleagues[24] proposes that the effects of these comparisons depend on an individual's interpretation. Upward social comparisons may result in being optimistic and finding hope in others doing better (i.e., upward identification), but could also cause frustration (i.e., upward contrast). Likewise, downward social comparison may result in feeling lucky to be in a better position (i.e., downward contrast), or it makes individuals anxious to be in the same situation one day (i.e., downward identification)[25].

In the context of cancer and online support groups, little is known about the occurrence and effects of such comparisons. Only a few studies focused on social comparison mechanisms within *offline* support groups. A study on women with breast cancer participating in an offline support group based on exercise and challenge showed that upward identification was positively related to post-

traumatic growth[26]. Another study, also in an offline setting, showed that upward identification was negatively related to depression[27]. One study assessed the effects of social comparisons in the context of reading about experiences of other patients with Ménières' disease in a support group magazine, and found positive associations between positive – upward or downward – social comparisons and quality of life, and negative associations between negative – upward or downward - comparisons and quality of life[28].

Although social comparison processes appear particularly relevant in online support communities, their influence on patients' well-being has not been tested in this setting. Drawing on the social comparison literature and the few findings from offline support groups, we propose that patients participating within an online support group report a better well-being when they make positive (upward or downward) online social comparisons, while patients who have the tendency to compare themselves negatively online (upward or downward) will report a lower psychological well-being.

Furthermore, we expect that the intensity of participation within the online support community moderates this relationship. The more active patients are online, the more they will be confronted with stories from peers, and the larger the impact of (positive and negative) social comparison processes may be. This expectation is underscored by a study comparing different *offline* interventions, which showed that breast cancer patients made more negative downward social comparisons in a peer-discussion group compared with an education (interactions between patients were inhibited) or control group[29]. We therefore propose that online activity moderates the effects of social comparison styles: whereas active patients who use optimistic social comparison (i.e., upward identification or downward contrast) will show a better well-being than active patients who use pessimistic social comparisons (i.e., upward contrast or downward identification), these relationships should be less pronounced in patients with lower levels of online activity.

Overview

In an attempt to extend knowledge on the effects of online peer-to-peer support on psychological well-being of its members we carried out a cross-sectional study on one of the important underlying (dis)empowering processes: social comparisons. To our knowledge this is the first quantitative study that focuses on social comparisons within online support groups. We conducted an online study among breast cancer patients who visit a peer-led support community (designed as a discussion board). We measured intensity of online participation, social comparison mechanisms and three measures of psychological well-being that are associated with breast cancer: emotional well-being[30], depression[31], and breast cancer-related concerns[32]. To rule out other factors outside the online peer support community that cause or decrease stress, we included factors that are often related to the psychological well-being of breast cancer patients, such as illness stage, perceived social support

from friends and family, and professional psychological help during the period of illness. We hypothesized that patients with a tendency to make pessimistic comparisons report a lower sense of psychological well-being (e.g., depression, emotional well-being, and breast cancer-related concerns) than patients who make optimistic comparisons. Furthermore, we expect this relationship to be stronger for patients who are highly active within the social support group compared to less active patients.

Method

Procedure and participants

We searched the Internet to identify all Dutch-language online 24-hour available peer-led message boards on breast cancer. With approval of the website owners, we asked patients to participate in an online survey about breast cancer and media use on seven active message boards. This survey was part of a more extensive project on the effects of peer-led online support groups among breast cancer patients. The research was carried out in line with APA ethics guidelines[33], complies with EU legislation[34], and with Dutch legislation on data protection[35]. A sample of 134 Dutch women diagnosed with breast cancer spread across the seven Dutch breast cancer peer support websites filled out the questionnaire. A number of 114 participants mentioned they were visiting a peer-led online support community designed as an online discussion board. The remaining 20 patients reported that they were not active within an online support community, and were therefore excluded from the analyses.

Measurements

Independent variables. Four items assessed *intensity of online support group participation* (cf.[36,37]) regarding patients' frequency of visits, average duration of visit, online contribution (i.e., to what extent do they read, actively write and respond online), and the number of posts in the last four weeks. *Frequency of visits* was assessed on a 7-point scale; the other items were assessed on a 4-point scale. To merge these different scales into one index, all items were transformed into Z-scores (Cronbach's α =.80).

Social comparison processes were measured by four different indices consisting of three items each, assessed on a 5-point scale[38]. Items were adjusted to online support group participation ("When I read about the experiences from others …"). Two indices measured pessimistic comparisons; *downward identification*, (e.g.,"… I fear that my future will be similar"; Cronbach's α =.95) and *upward contrast* (e.g.,"… I feel frustrated about my own situation"; Cronbach's α =.86). Two indices assessed optimistic comparisons; *upward identification* (e.g.,"… I realize it is possible to improve"; Cronbach's α =.87) and *downward contrast* (e.g.,"… I realize how well I am doing"; Cronbach's α =.77).

Dependent variables. Three indices measured psychological well-being. First we measured *depression* with 10 items on a 5-point scale (CES-D10; e.g., "my sleep was restless")[31]. The index was internally consistent (Cronbach's α = .81) but was positively skewed. A log-transformation was performed to meet the assumptions of multiple regression analysis. Higher scores indicated more depressive thoughts. Breast cancer-related concerns (Profile of Concerns about Breast Cancer[32]) were measured with an index of 28 items assessed on a 5-point scale. The index showed consistency, Cronbach's α = .92 (e.g., "As you think about your illness, how much are you concerned that chemotherapy or radiation therapy will damage your body in some way?"). Higher scores indicated more concerns. Emotional well-being was measured with six items taken from the FACT-B[30] on a 5-point scale (e.g., "I'm proud of how I am coping with my illness") and showed scale consistency, Cronbach's α =.86. Higher scores indicated a better emotional well-being.

Control variables. We measured participants' age, education level, working status (yes/no), if they were under treatment at the moment (yes/no), the amount of medical appointments concerning the breast cancer in the last 3 months, illness stage, offline social support, and if patients received any professional psychological help regarding their illness (yes/no); factors that are considered as important covariates of patient well-being. *Illness stage* was measured by the standard four phases in breast cancer[39]. Six items from the FACT-B[30] measured *offline social support* on a 5-point scale. Items referring to friends were adjusted into items that clearly referred to their offline friends (Cronbach's α =.80).

Statistical analyses

We tested different models with regression analysis. All independent variables were standardized into z-scores to allow computing interaction-terms. We tested three models including (1) the covariates that were significantly related to the dependent variable (see Table 3), (2) the intensity of online support group participation and the social comparison processes as independent variables, and (3) the interaction term of the intensity of online support group participation and the social comparison strategy on the indicators of psychological well-being (i.e., depression, breast cancer-related concerns, emotional well-being).

Results

Sample characteristics

Table 1 shows the demographics and illness characteristics of the patients within our sample. The mean age of participants was 49, most of them were well educated, and almost 60 percent was still working. Most of them were free of cancer cells at that moment (67,7%), but approximately half the participants were still under treatment. On average, participants had four medical appointments regarding their breast cancer in the last 3 months, and almost 44 percent experienced psychological counseling during their period of illness.

Table 1. Demographics and Health Characteristics

		n	%
Age (n=134)			
Mean (SD)	49 (8.75)		
Minimum	23		
Maximum	69		
Education level[a] (n=133)			
Elementary school		4	3,00%
Secondary education	Low	20	15,00%
	Middle	12	9,00%
	High	1	0,80%
Tertiary education	Low[b]	9	6,80%
	Middle	37	27,80%
	High	41	30,80%
	Scientific Degree	9	6,80%
Working status (n=133)			
	Not working	54	40,60%
	Working	79	59,40%
Illness stage (n=124 [10 unknown])			
	No cancer cells at the moment	84	67,70%
	Tumor smaller than 2 cm. no metastases to the lymph nodes (Stage I)	10	8,10%
	Metastases to the lymph nodes in the armpit. or a tumor larger than 2 cm with no metastases (Stage II)	16	12,90%
	Metastases to multiple lymph nodes or other lymph nodes (Stage III)	7	5,60%
	Metastases to other body parts (Stage IV)	7	5,60%
Under treatment at the moment (n=134)			
	Yes	68	50,70%
	No	66	49,30%
Medical appointments the last 3 months (n=133)			
Mean (SD)	4 (6.32)		
Minimum	0		
Maximum	40		
Psychological help during period of illness (n=133)			
	Yes	58	43,60%
	No	75	56,40%

Notes. [a]levels within the Dutch education system: education is divided across three schools for different age groups, which are subdivided across different educational levels. [b]LBO/LTS existed until 1992

Online support group participation

Table 2 shows activity within the online community. Most patients visited the online community multiple times per week or every day. The majority of patients did not post at all or posted only a message once per week or less. Approximately a third of participants only read posts from others, while others also reacted on posts from others or started new topics of discussion by themselves. Most patients were online for a maximum of 30 minutes per visit.

Table 2. Use of the Online Support Community

	n	%
Never visited an online BC support community	20	
Frequency of visits (n=114)		
Less than once a month	13	11.4%
Approximately once a month	14	12.3%
Multiple times per month	8	7%
Approximately once a week	18	15.8%
Multiple times per week	22	19.3%
Approximately once a day	24	21.1%
Multiple times per day	15	13.2%
Frequency of posts the last 4 weeks (n=114)		
Non	44	38.6%
One per week or less	35	30.7%
Multiple posts per week. but not every day	20	17.5%
Every day one post or more	15	13.2%
Forum contribution (n=114)		
I only read posts from others	34	29.8%
I reacted on (a) post(s) of someone else	32	28.1%
I started a new topic or asked a question	7	6.1%
I both started a new topic or asked a question AND I reacted on (a) post(s) of another	41	36%
Average length of visits (n=114)		
Less than 10 minutes	41	36%
10 to 30 minutes	60	52.6%
30 minutes to one hour	10	8.8%
More than one hour	3	2.6%

Online activity, social comparison and well-being

Table 3 shows the correlations between all variables of the current study. Intensity of online participation was positively correlated with upward identification. This suggests that the more patients could relate to stories from peers doing better than them (i.e., finding hope), the more active they were online.

The intensity of online support group participation in itself was not related to psychological well-being. However, as expected downward identification and upward contrast were negatively related to psychological well-being (all three well-being measures). Upward identification was negatively associated with depression; downward comparison was positively related to emotional well-being and negatively related to depression.

Regarding covariates, offline social support was significantly associated with all three well-being measures, and with downward identification and upward contrast. The less patients felt supported by their friends and family, the worse their psychological well-being, and the higher they scored on pessimistic social comparison processes. Illness stage correlated significantly with emotional well-being: when the illness was further progressed patients reported a lower emotional well-being. Moreover, psychological help was associated with all well-being measures; patients who received psychological help from a professional during the period of illness reported a lower psychological well-being.

Table 3a. Means, Standard Deviations, and Intercorrelations of Independent Variables, Covariates, and Dependent Variables (part 1)

		M	SD	1	2	3	4	5	6	7
1.	Intensity of OSG[a] participation	0	0.79	-						
2.	Downward Identification	2.62	1.08	.15	-					
3.	Upward Identification	3.68	0.68	.22[c]	-.10	-				
4.	Downward Contrast	3.90	0.68	.09	-.20[c]	.25[d]	-			
5.	Upward Contrast	2.51	0.85	.02	.37[d]	-.15	-.09	-		
6.	Age	48.59	8.75	-.18	-.22[c]	-.09	-.05	.04	-	
7.	Education	6.38	1.95	-.07	-.15	-.05	.01	-.04	-.20[c]	-
8.	Working status[b]	0.59	0.49	-.04	-.14	.00	.10	.04	-.23[d]	.37[d]
9.	Illness stage	1.74	1.22	.06	.15	-.01	-.03	.15	-.03	-.09
10.	Under treatment[b]	0.51	0.50	.15	-.05	.21[c]	.15	-.12	-.12	-.03
11.	Medical appointments	3.58	6.32	.21[c]	-.06	.15	-.03	-.17	.01	-.11
12.	Psychological help[b]	0.44	0.50	.01	.17	-.03	-.02	.19[c]	-.42[d]	.09
13.	Offline social support	3.83	0.67	.10	-.26[d]	.10	.17	-.32[d]	.07	.17
14.	Emotional well-being	3.70	0.67	-.11	-.58[d]	.14	.23[c]	-.58[d]	.13	.18[c]
15.	BC Concerns	2.52	0.63	-.01	.38[d]	-.10	-.16	.49[d]	-.10	-.26[d]
16.	Depression (log)	0.22	0.13	.08	.34[d]	-.20[c]	-.18[c]	.38[d]	-.12	-.23[d]

Notes. [a]Z-scores; [b]Coded 0=no, 1=yes; [c]correlations significant at the .05 level; [d]correlations significant at the .01 level.

Table 3b. Means, Standard Deviations, and Intercorrelations of Independent Variables, Covariates, and Dependent Variables (part 2)

		8	9	10	11	12	13	14	15
9.	Illness stage	-.18[c]							
10.	Under treatment[a]	-.06	.27[d]	-					
11.	Medical appointments	-.20[c]	.30[d]	.10	-				
12.	Psychological help[a]	.14	.03	-.13	.04	-			
13.	Offline social support	.07	-.13	.02	.19[c]	-.14	-		
14.	Emotional well-being	.12	-.23[c]	.06	-.05	-.27[d]	.32[d]	-	
15.	BC Concerns	-.26[d]	.11	.00	.00	.29[d]	-.41[d]	-.55[d]	-
16.	Depression (log)	-.15	.17	-.01	-.01	.29[d]	-.34[d]	-.62[d]	.57[d]

Notes. [a]Z-scores; [b]Coded 0=no, 1=yes; [c]correlations significant at the .05 level; [d]correlations significant at the .01 level.

Emotional well-being

Regression analyses showed no main effect of the intensity of online participation on emotional well-being. However, both pessimistic comparisons (i.e., downward identification and upward contrast) were negatively related to emotional well-being. The more participants identified with peers doing worse than them and the more they experienced negative affect when they were doing worse than others, the lower they scored on emotional well-being (Table 4). No significant interaction effects with online activity were found. In addition, almost all covariates – except for education level – became non-significant predictors for emotional well-being when social comparison mechanisms were included in the model.

Breast cancer-related concerns

Results showed a main effect of downward identification on breast cancer-related concerns; the more participants experienced negative affect when others were doing better than them, the more concerns they had (Table 4). No main effect of intensity of online participation was found. Furthermore, a marginally significant interaction effect of downward identification and online support group participation on breast cancer-related concerns was found. Patients who were active (+1 SD) within the online community and who identified with peers doing worse (+1 SD) reported more breast cancer-related concerns than equally active patients who did identify less (-1 SD) with peers worse off. For patients less active online (-1 SD), downward identification was not associated with the amount of breast cancer-related concerns (Figure 1). No other interaction effects were found.

Table 4. Hierarchical Regression Results for the Effects of Online Participation and Social Comparisons on Emotional Well-being, Breast Cancer-related Concerns, and Depression

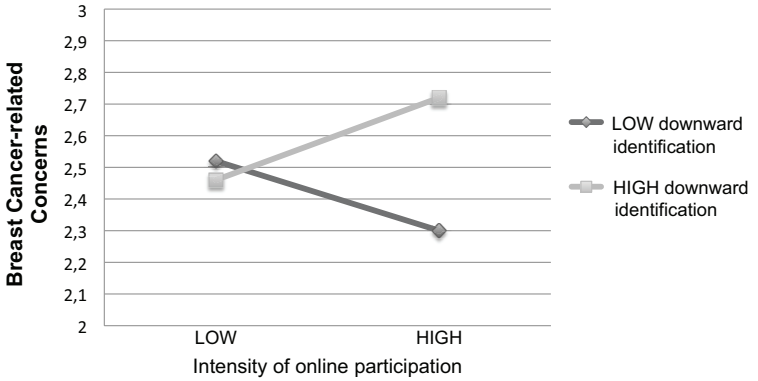
	Emotional well-being (n=103[b])			BC concerns (n=112)			Depression (n=112)		
Variable	***b (SE)***	***b***	***p***	***b (SE)***	***b***	***p***	***b (SE)***	***b***	***p***
Covariates									
Education	0.14 (.07)	0.17	.035	-0.07 (.05)	-0.11	.192	-0.02 (.01)	-0.19	.037
Working status	-	-	-	-0.21 (.11)	-0.16	.049	-	-	-
Illness stage	-0.07 (.07)	-0.08	.280	-	-	-	-	-	-
Psychological help[a]	-0.23 (.13)	-0.12	.090	0.26 (.10)	0.20	.010	0.07 (.02)	0.26	.003
Offline social support	0.07 (.07)	0.08	.296	-0.14 (.06)	-0.21	.015	-0.03 (.01)	-0.20	.037
Main effects									
(A)Intensity of online participation	-0.10 (.07)	-0.11	.145	0.01 (.07)	0.01	.881	0.01 (.01)	0.10	.245
(B)Downward identification	-0.18 (.08)	-0.20	.019	0.09 (.06)	0.14	.128	0.01 (.01)	0.07	.507
(C)Downward contrast	0.02 (.07)	0.02	.791	-0.01 (.05)	-0.02	.825	-0.01 (.01)	-0.06	.480
(D)Upward identification	0.05 (.06)	0.06	.428	-0.01 (.05)	-0.01	.900	-0.02 (.01)	-0.12	.163
(E)Upward contrast	-0.39 (.07)	-0.47	<.001	0.20 (.05)	0.31	.001	0.02 (.01)	0.19	.054
Interaction effects									
A x B	-0.04 (.08)	-0.04	.655	0.12 (.06)	0.17	.055	0.00 (.01)	-0.01	.930
A x C	-0.05 (.07)	-0.06	.518	0.08 (.05)	0.13	.156	0.01 (.01)	0.07	.506
A x D	0.04 (.06)	0.05	.538	-0.03 (.05)	-0.05	.566	0.00 (.01)	-0.02	.804
A x E	0.02 (.07)	0.03	.766	-0.02 (.06)	-0.03	.696	0.00 (.01)	0.03	.766
R^2	.56			.49			.34		
Adjusted R^2	.50			.42			.26		

Notes. [a]Coded 0=no, 1=yes; [b]Nine participants were not aware of their stage of illness, exclusion of illness stage from the model (n=112) showed the same (marginally) significant predictor variables (i.e., education, psychological help, downward identification, and upward contrast).

Depression

The intensity of online participation did not show a main effect on depression. However, upward contrast was marginally significantly related to depression. Again, the more patients experienced negative affect when they felt that they did worse than others, the more depressed they felt. No interaction effects of social comparison strategies and the intensity of online participation were found (see Table 4).

Figure 1. Interaction effect of (A) Online Activity and (B) Downward Identification on Breast Cancer-related Concerns



Note. 'low' means one standard deviations below the mean, and 'high' one standard deviation above the mean.

Discussion

The current study examined social comparison processes among breast cancer patients participating in a peer-led online support community. More specifically, we assessed the relation between patients' online activity within the community, social comparison processes and their psychological well-being. Online activity was in itself not associated with a better psychological well-being. As expected, social comparison processes – especially pessimistic comparisons - played a crucial role in psychological well-being. Findings revealed negative relations between downward identification and emotional well-being, upward contrast and emotional well-being, and positive relations between upward contrast and depression, and upward contrast and breast cancer-related concerns. When patients identified with other patients doing worse or experienced negative affect when others were doing better than them, they reported lower psychological well-being than patients who scored low on these negative comparison mechanisms.

Furthermore, we found some tentative evidence that downward identification influenced the relationship between the intensity of online participation and breast cancer-related concerns. When patients were highly active online and identified with others worse off, they experienced more cancer-related concerns compared to active patients who did not identify with patients in a worse situation. For less active patients downward identification did not influence breast

cancer-related concerns. This finding marginally supports our expectation that especially for patients who are highly active online identifying with negative stories has a negative influence on well-being. Being frequently confronted with negative stories from others may frighten patients and increase more concerns regarding the illness. Alternatively, patients with concerns might be more active online, and because of their concerns they might identify with peers worse off. Whereas patients highly active with less concerns, also identify less with peers worse off. Longitudinal research is needed to confirm causality.

Although our findings showed an initial positive correlation between the two optimistic comparison processes and psychological well-being, optimistic social comparisons were less strongly related to well-being than pessimistic comparisons, and did not predict psychological well-being in the regression analyses. Furthermore, we found a positive correlation between the intensity of online participation and upward identification (i.e., identifying with patients doing better). None of the other comparison mechanisms were related to online activity. This suggests that although online active patients identify with positive stories, reading such stories does not necessarily affect psychological well-being. One possible explanation is that negative stories are more abundant online than positive stories. A qualitative case study in which one patient's online activity was monitored during the period of illness showed that this patient especially turned to the online group when she experienced difficulties regarding the breast cancer[40]. Although this case study is not generalizable to all patients, it points to the possibility that patients mainly need support from peers when they experience a distress-inducing event, and therefore mainly write about negative experiences.

Alternatively, the impact of pessimistic comparisons may override the effects of optimistic comparisons[41]. Patients may identify with survivor stories or feel lucky doing better than others, but it might not immediately affect psychological well-being. Such comparisons might serve other goals that affect well-being over time. For example, patients in the midst of the disease may learn from survivors how to cope with the illness.

Another explanation might be that patients feeling worse psychologically also use more pessimistic comparisons. It might be hard for them to view their situation from a more positive angle. Additionally, pessimistic comparisons possibly elicit a negative downward spiral; patients already feeling unwell might feel even worse because of these pessimistic comparisons. Longitudinal research is, however, needed to reveal causality and long-term effects.

The present findings extend previous research on the effects of support group participation by showing that a direct positive relationship between the intensity of participation and well-being might not always hold. Patient specific processes and characteristics, such as social comparison mechanisms, might affect its' outcomes. Recent studies have started looking into the influence of individual differences on the effects of online support group participation, such as self-efficacy[42] and coping with emotions[18]. Gaining more insight into moderating

factors is essential to increase our understanding of online peer-to-peer support effects on psychological well-being, as online support group effects may be multidimensional in nature due to different psychological processes.

Current findings also showed that other factors outside the online environment affect patients' psychological well-being, such as perceived support from friends and family, and illness stage. Since self-generated, peer-led, online support groups are "uncontrolled" online environments – i.e., patients are anonymous, start participating and leave the online community at different points in time, and differ in online activity- it is almost impossible to create a matched control group. Therefore including other factors outside the online environment is essential to uncover the "bigger picture"; it enables to distinguish the effects of online processes from offline factors that also play an important role when it comes to patients' psychological well-being.

Limitations and future research

A limitation of the present study is its cross-sectional nature that prevents us from drawing causal conclusions. The relationship between online social comparison mechanisms and psychological well-being can be explained in both directions. One explanation is that negative online comparisons decrease patients' well-being. However, an alternative explanation is that patients may go online because of a stressful event regarding their illness, and in turn the elicited distress increases the use of pessimistic comparisons. Although we controlled for patients' current illness status, future research is needed to confirm causality.

Furthermore, the current sample of online support group users included a relatively large proportion of breast cancer survivors who were currently not under treatment. Even though cancer survivors never get the official status of being cured after treatment and the recovery period often takes quite some time, future research is needed to confirm if the same results hold with a sample of patients who are in the midst of treatment.

Conclusion

Online support communities provide patients with the unique opportunity to compare their own situation with that of peers, both pessimistically and optimistically. Our findings suggest that especially pessimistic comparisons have an influence on participants' psychological well-being: patients who identified with others worse off than them (i.e., downward identification), or patients who experienced negative affect when reading stories from others doing better (i.e., upward contrast) reported lower psychological well-being than patients who did not compare themselves negatively with others. Optimistic comparisons were not related to well-being. Although online peer-to-peer interactions give patients the opportunity to find hope, recognition and understanding by comparing their own situation with others', patients should be careful not to become 'entrapped' by pessimistic social comparison processes.

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